1457

USE OF SODIUM BICARBONATE IN OUT-OF-HOSPITAL CARDIAC ARREST: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction/Hypothesis: Sodium bicarbonate (SB) use during cardiac arrest has been a subject of debate for decades. Despite the lack of convincing evidence for its benefit, SB continues to be administered during the management of patients in cardiac arrest. We performed this study to summarize the evidence about the use of SB in patients with out-of-hospital cardiac arrest (OHCA).

Methods: We searched PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library, until June 2019, for randomized controlled trials (RCTs) and observational studies that used SB in patients with OHCA. Outcomes of interest were the rate of survival to discharge, return of spontaneous circulation (ROSC), sustained ROSC, and good neurological outcomes at discharge.Odds ratio (OR) with their 95% confidence interval (CI) were pooled in a random or fixed meta- analysis model.

Results: A total of 14 studies (four RCTs and 10 observational studies), enrolling 28412 patients were included; of them, eight studies were included in the meta-analysis. The overall pooled estimate did not favor SB or control in terms of survival rate at discharge (OR= 0.66, 95% CI [0.18, 2.44], p=0.53) and ROSC rate (OR= 1.54, 95% CI [0.38, 6.27], p=0.54). While, the pooled estimate of two studies showed that SB was associated with less sustained ROSC (OR= 0.27, 95% CI [0.07, 0.98], p=0.045) and good neurological outcomes at discharge (OR= 0.12, 95% CI [0.09, 0.15], p<0.01).

Conclusions: The current evidence demonstrated that SB was not superior to the control group in terms of survival to discharge and return of spontaneous circulation. Further, SB was associated with lower rates of sustained ROSC and good neurological outcomes.

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1459

ENDOVASCULAR BALLOON OCCLUSION IN REFRACTORY CARDIAC ARREST PATIENTS: PRELIMINARY RESULTS

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Introduction/Hypothesis: Outcome after non-traumatic cardiac arrest (CA) remains poor, especially if return of spontaneous circulation is not established within 10 minutes (refractory CA). Chest compressions during cardio-pulmonary resuscitation (CPR) achieve a maximum of 30% of normal coronary and cerebral perfusion, but ROSC and favorable outcome depends on coronary and cerebral perfusion. In animal models of CA, clamping the descending aorta augments blood pressure in the proximal aorta, thus increasing coronary and cerebral perfusion pressure, leading to improved rates of ROSC, 48h-survival and neurological function. Resuscitative Endovascular Balloon Occlusion (REBOA) of the descending aorta is an established procedure in exsanguinating trauma patients, but has never been adopted for non-traumatic CA patients. The aim of our project was to prove feasibility of REBOA during CA under ongoing CPR

Methods: Patients qualified for the study if they suffered from refractory CA and were not suited for eCPR. An ER-REBOA catheter (Prytime Medical) was placed without fluoroscopic guidance via a 7F introducer sheath in the femoral artery. Primary outcome was successful placement within 10 minutes from skin disinfection. Secondary objectives included change in blood pressure, end- tidal CO2 and non-invasive cerebral oxygenation (NIRS).

Results: Successful catheter placement was achieved in 8 out of 12 patients, in 5 patients within 10 minutes (median 9:45 min, range 6:05 to 18:00 min). Overall, neither blood pressure nor etCO2 changed significantly; but in 3 patients, a marked increase in blood pressure was noted after balloon inflation. In one patient with pulseless electrical activity, ROSC was achieved following occlusion of the aorta. NIRS increased significantly ([median, 95% CI] 39 (31-63) to 42 (23-78), p=0.005). All but one patient suffered from out-of-hospital CA, therefore study inclusion was late in the course of resuscitation.

Conclusions: Rapid placement of a REBOA catheter is feasible in approx. 66% of patients, and has the potential to increase coronary and cerebral perfusion pressure. To improve success rate, a structured training program might be helpful. Further studies are needed to evaluate better patient selection and timing of the REBOA procedure in CA patients.

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